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PROTECTING POTATOES FROM LATE BLIGHT

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What is Late Blight?

LATE BLIGHT, one of the major potato diseases, causes serious losses where favorable conditions for its development occur. Severely damaging and wasting one of the Nation's most essential food crops, it is a primary limiting factor in food production.

In 1942 blight, making a record general attack, swept as far west as the Great Plains. Some States reported its occurrence for the first time. Losses from vine killing and tuber rotting for the country as a whole involved many millions of bushels. Several important potato-producing States reported reductions in yields of 20 to 25 percent. Because the growing season was excellent in other respects and commercial growers did a good job of spraying, enough sound potatoes were produced to avoid a too serious shortage. Blight commonly occurs in the early-potato-producing sections from Florida northward to New Jersey along the eastern seaboard and intermittently along the Pacific coast. It is very destructive in the northern late-potato-producing sections from the New England and the Middle Atlantic States westward to the States bordering on the Great Lakes.

When Does Late Blight Appear?

The name "late blight" suggests that plants are affected late in the season or late in their stage of growth. However, they may be attacked early in the season or soon after they come up.

What Are the Late Blight Symptoms?

Typical symptoms of late blight are shown in the illustration on the cover. Late blight kills the vines and rots the tubers.

On the leaves the disease appears as water-soaked areas, blotches, or spots, which later become brownish black and die. To distinguish this disease from

other leaf spots examine the under sides of freshly blighted leaves for a white growth of mildew around the margins of the spots. (A magnifying glass is sometimes useful for close examination.) Stems and leafstalks are also attacked.

On infected tubers, firm, dark-brown, sunken, decayed areas occur. When an infected tuber is cut, a reddish-brown dry rot is seen extending about one-quarter of an inch into the flesh. The late blight dry rot is frequently followed by soft rots due to other causes.

What Causes Late Blight?

Late blight is caused by a mildew, or fungus, which lives on the plant and kills it. The fungus grows through the under surface of the leaves where it produces microscopic seedlike bodies known as spores. These are spread by wind to other plants where, if sufficient moisture is present, they germinate and cause new infections. Spores also are washed into the soil and infect the tubers.

How Does Late Blight Get Started?

The blight fungus lives over winter in infected tubers, but so far as known it does not overwinter in the soil. There are two principal ways for the disease to get started in potato fields:

(1) **From the planting of infected seed potatoes.** Sprouts from infected seed pieces or tubers may become infected. The spores on these sprouts or young plants infect nearby plants and start an infection center from which whole fields may become blighted.

(2) **From old, infected potatoes of the previous year's crop.** Unusable tubers are commonly thrown out when potatoes are sorted and storage houses and cellars are cleaned. Some of these may be affected with the late blight fungus and may provide a source of infection for the sprouts and young

plants that grow from them. From the dump pile it is an easy jump to nearby fields of growing potato plants.

What Kind of Weather Favors Blight?

Late blight develops and spreads fastest during periods of rainy, misty, or cloudy weather when the temperature ranges from 65° to 70° F. Heavy dews, rank vine growth, shade, and anything else that keeps moisture on the leaves for hours at a time make it worse. Under wet conditions the disease may spread so rapidly that in a short time it kills all the plants in a field.

How Can Late Blight and Rot be Controlled?

1. Do away with the dump pile.

Partly rotted potatoes taken out of storage and piled or scattered on the ground may sprout and spread blight to the growing crop. Therefore, prevent all such waste potatoes from growing by feeding them to livestock or by burning them. This is a more important control measure than has been realized.

2. Use the best seed.

By using blight-free seed a grower can sometimes delay the start of blight in his field. Under wet weather conditions, however, the fungus quickly comes in from outside sources. Seed treatment will not prevent blight. It pays to get the best seed and to sort out rotted tubers.

3. Protect vines with copper sprays and dusts.

The cheapest and most effective spray for potatoes is bordeaux mixture. The old standard formula is 8–8–100 (8 pounds of copper sulfate, 8 pounds of hydrated lime, 100 gallons of water). However, an 8–4–100 mixture gives just as good results and saves lime.

Four pounds of calcium arsenate or lead arsenate is added as needed to control insects.

Power and traction sprayers fitted with three nozzles per row and delivering about 120 gallons per acre at 300 to 400 pounds' pressure are used in commercial fields. Spray booms and nozzles should be carefully adjusted so that best coverage is obtained. Complete coverage is a primary essential for satisfactory blight control.

In general, spraying should be started early when the plants are about 6 inches high. The time and number of applications will vary with the season and the locality. In areas subject to blight and in blight years, weekly spraying is usually necessary. In other localities and during dry seasons fewer sprayings will do. Growers often stop spraying too early. The late applications, right up to maturity of vines, are often most important. Remember that spraying does not cure plants already blighted. It protects plants from becoming blighted. So spray before rainy periods and keep the leaves protected with copper.

Copper dusts, although perhaps not quite so effective as the bordeaux spray, give good control when proper materials are selected and applied correctly. They have several advantages over sprays and are preferred by many growers. They are especially useful to the small grower and gardener.

Copper-lime-arsenate dust (20 pounds monohydrated copper sulfate plus 70 pounds fresh hydrated lime plus 10 pounds calcium arsenate) is a standard mixture for dusting potatoes. The dust can be purchased or mixed at home. It is usually applied at the rate of 25 to 35 pounds per acre.

Arsenical compounds are highly poisonous to men and animals and must be handled carefully. A res-

pirator should be worn by the operator while mixing and applying them as dusts. Hands, face, and clothing should be washed thoroughly after spraying and dusting operations.

"Fixed copper" or "insoluble copper" fungicides (cuprous oxide, tribasic copper sulfate, copper oxychloride, etc.) are on the market for use as either dusts or sprays for potatoes. When properly used these usually give nearly as good control of blight as bordeaux.

It is best to dust potatoes in the evening, early morning, or even at night when there is no wind. Dew on the leaves helps make copper-lime dust stick. The dusting machine should be carefully adjusted and operated, so as to discharge a uniform cloud of dust.

Methods of mixing bordeaux and dusts, the formulas, and spraying and dusting schedules vary with the States; therefore it is suggested that the county agricultural agents or the State agricultural colleges be consulted for more exact or detailed recommendations on spraying and dusting.

4. Dig tubers only after blighted vines are dead.

Potatoes dug while the vines are still green and freshly blighted may become infected from contact with the fungus; then more rot will develop in storage. The best way to avoid heavy losses is to delay the digging of potatoes to be stored until the infected plants have been killed by frost or are completely dead and dried up.

Never cover barrels or piles of potatoes in the field with blighted vines.

5. Store the crop carefully.

Practically all the late blight rot that develops in storage gets its start in the field or during harvesting. Under cool storage conditions it develops slowly and may not show up for several weeks after digging. Sort out all visible rotted tubers before placing the crop in permanent storage.

Storage rooms should be kept dry with no moisture condensing on ceiling, walls, or tubers. The temperature should be held as close to 36° to 40° F. as possible.

6. Use blight-resistant varieties.

Most common potato varieties are very susceptible to late blight. However, Sebago, one of the new late varieties developed by the United States Department of Agriculture, is very resistant. The Sebago tubers are much more resistant than the tops. For satisfactory control of late blight, Sebago requires about a third the number of spray applications that the more susceptible varieties do. Though the adaptability of Sebago has not been fully determined, it has performed well in Maine, New York, Florida, Michigan, Minnesota, Wisconsin, and western Washington.

Other blight-resistant varieties are being developed by the United States Department of Agriculture in cooperation with the State agricultural experiment stations.

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